Standard on Respirators for Wildland Fire Fighting Operations

Tim Rehak
NIOSH/NPPTL Policy and Standards Development, Pittsburgh PA

Courtesy L. Naeher

Abstract

The National Fire Protection Association (NFPA) Technical Committee on Respiratory Protection Equipment has requested NIOSH NPPTL technical support in developing performance requirements for respirators used in wildland firefighting operations and desired that the respirator be approved by NIOSH as part of the NFPA requirements.

Expedited development of a new wildland fire fighting respirator is needed to reduce the serious potential health risks to wildland fire fighters. Health concerns associated with fighting wildland fires include irritation from smoke exposure, carbon monoxide effects, and acute toxic effects of short term high exposure events resulting from rapid changes in fire conditions.

Wildland fire fighters are exposed to fluctuating concentrations of airborne toxins from smoke and fire gases in an outdoor environment. The outdoor environment provides ventilation that is dependent on wind speed and direction relative to the location of the fire. Under ideal conditions, wildland fire fighters are exposed to low concentrations of smoke particulates and toxic fire gases. Changing conditions at the fire scene can result in short term high exposures to carbon dioxide, carbon monoxide, nitrogen oxides, sulfur dioxide, benzene, aldehydes (*e.g.*. formaldehyde, acrolein), free radicals, and respirable particulate matter.

Wildland fire fighters currently use devices that are not approved by NIOSH, various NIOSH-approved filtering facepiece respirators or no device for respiratory protection at all. Many unapproved devices do not provide adequate protection or any protection against the health risks these fire fighters encounter.

Introduction

The NFPA standard defines the performance and design requirements for the certification of powered and non-powered air-purifying respirators as Wildland Fire Fighting Respirators under the 2011 edition of NFPA 1984, *Standard on Respirators for Wildland Fire Fighting Operations*.

NIOSH approval requirements in 42 CFR Part 84 for an air purifying respirator or powered air purifying respirator are used, with provisions defined for new test gases, as a condition of approval to NFPA 1984 standard.

New NIOSH test methods to protect against the combination of gas and vapor exposures experienced by wildland fire fighters will be developed.

Standards Scope

NFPA Certification for Air Purifying respirators (APRs) and Powered Air Purifying Respirators (PAPRs) for use in wildland fire fighting operations, t hat also requires NIOSH approval is similar to certifications issued for SCBAs under NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*.

Courtesy C. Austin & SOPFEU

Courtesy C. Austin

Scope of NFPA Standard

NFPA 1984 Design/Performance Requirements:

- **Minimum protection factor of 10**
- **Heat Resistance**
- **Flame Resistance**
- **Respirator Storage Integrity**
- **Lens Abrasion Resistance**
- **Donning Performance**
- **Communication Performance**
- **Corrosion Resistance**
- **NIOSH Certified APR or PAPR**

NIOSH Certified APR or PAPR: Gas and Vapor Protections

- **Carbon Monoxide**
- **Organic Vapors**
- **Sulfur Dioxide**
- **Nitrogen Dioxide**
- **Formaldehyde**
- **Acrolein**

Disclaimer

The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.

CDC Workplace Safety and Health™ NIOSH NPPTL Research to Practice through Partnerships